

**REMARKS**

Applicants concurrently file herewith a Petition for Extension of Time, and corresponding extension of time fee, for a two-month extension of time.

Claims 1-10, 14-17 and 19-21 are all the claims presently pending in the application. Claim 1 has been amended to more particularly define the claimed invention. Claim 18 has been canceled without prejudice or disclaimer. Claims 20 and 21 have been added to claim additional features of the invention and to provide more varied protection for the claimed invention.

Applicants specifically state that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Applicants gratefully acknowledge the Examiner's indication that claims 3, 4, 8-10, 14 and 15 are allowed. However, Applicants submit that all of claims 1-10, 14-17 and 19-21 are allowable.

Claims 1, 5, 7, 16, 17 and 19 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Etsuro (Japanese Patent No. JP 2001-108025). Claim 2 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Etsuro. Claims 1, 5-7, and 16-19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Murakami et al. (U.S. Patent Application Publication No. 2001/0040067; hereinafter "Murakami") in view of Eda et al. (U.S. Patent Application Publication No. 2004/0245040; "hereinafter "Eda").

These rejections are respectfully traversed in the following discussion.

## **I. THE CLAIMED INVENTION**

The claimed invention of exemplary claim 1 provides a curved leaf spring fitted along an outer peripheral surface of the bearing and an inner surface of the support portion, wherein the curved leaf spring includes end portions, the end portions being selected from the group consisting of overlapping end portions and end portions having a bent portion, and wherein a substantially entire intermediate portion of the curved leaf spring except opposite the overlapping end portions or the end portions having a bent portion of the curved leaf spring contacts the inner surface of the support portion and the outer peripheral surface of the bearing (e.g., see Application at page 16, line 5 and Figure 4; and Figure 6). This feature is important for eliminating a gap between the bearing and the curved leaf spring as well as between the curved leaf spring and the support member, which limits the movement of the worm (see Application at page 16, lines 5-11).

## **II. THE PRIOR ART REJECTIONS**

### **A. The Etsuro Reference**

The Examiner alleges that Etsuro teaches the claimed invention of claims 1, 5, 7, 16, 17 and 19. Furthermore, the Examiner alleges that the claimed invention of claim 2 would have been obvious in view of Etsuro. Applicants submit, however, that Etsuro does not teach or suggest each and every feature of the claimed invention.

That is, Etsuro does not teach or suggest “*wherein said curved leaf spring comprises end portions, said end portions being selected from the group consisting of overlapping end portions and end portions having a bent portion, and a substantially entire intermediate portion of said curved leaf spring except opposite said overlapping*”

*end portions or said end portions having a bent portion of said curved leaf spring*

*contacts said inner surface of said support portion and said outer peripheral surface of said bearing”, as recited in claim 1.*

The Examiner attempts to rely on Figure 5 of Etsuro to support his allegation.

The Examiner, however, is clearly incorrect.

That is, nowhere in this Figure (nor anywhere else for that matter) does Etsuro teach or suggest that the curved leaf spring includes end portions, the end portions being selected from the group consisting of overlapping end portions and end portions having a bent portion, and wherein a substantially entire intermediate portion of the curved leaf spring except opposite the overlapping end portions or the end portions having a bent portion of the curved leaf spring contacts the inner surface of the support portion and the outer peripheral surface of the bearing. Indeed, the Esturo clearly teaches several significant gaps between the leaf spring and the bearing and support member.

Indeed, Etsuro merely teaches an electric steering device provided with a worm (71) and a worm wheel (72) engaged with the worm (71). The worm (71) can be displaced in the direction of the worm wheel (72) and in the axial direction of the worm wheel (72). The worm (71) is provided with a leaf spring (31) and a coil spring, which eliminate backlash in the worm (see Etsuro at Abstract).

As shown in Figure 5 of Etsuro, the leaf spring (31) merely contacts the bearing (17) at two discrete points. Additionally, only portions of the leaf spring (31) are fitted along the inner surface of the support portion (81). This results in large gaps between the curved leaf spring (31) and the bearing (17) and the support member (81) (see Etsuro at Figure 5).

In contrast, the claimed invention of exemplary claim 1 (e.g., as depicted in Figures 4 and 6) provides a curved leaf spring (12) where the curved leaf spring includes end portions, the end portions being selected from the group consisting of overlapping end portions and end portions having a bent portion, and wherein a substantially entire intermediate portion of the curved leaf spring except opposite the overlapping end portions or the end portions having a bent portion of the curved leaf spring contacts the inner surface of the support portion and the outer peripheral surface of the bearing. This helps to avoid a gap between the curved leaf spring (12) and the inner side (74b) of the support portion (74), and a gap between the curved leaf spring (12) and the rolling bearing (8). Thus, the movement of the worm (3) in a direction intersecting the directions of the rotation-axis distance (H) may be limited (see Application at page 16, lines 5-11).

Furthermore, as compared with conventional devices, the structure around the worm gear (3) may be made compact. Therefore, the overall size of the motor-driven power steering apparatus may be reduced (see Application at page 15, lines 17-21). This feature is not taught or suggested by Etsuro. Therefore, the advantages provided by the claimed invention of exemplary claim 1 are not realized by Etsuro.

In response to Applicants' arguments filed on January 20, 2006, the Examiner makes several clearly erroneous allegations regarding the claimed invention.

First, the Examiner alleges that Applicants have not defined what constitutes an intermediate portion and end portions of the leaf spring. Specifically, the Examiner alleges that there is no definition in the specification or the claims of where the

intermediate portion ends and the end portion begins. As indicated, above, the Examiner is clearly incorrect.

Applicants point out that, with reference to Figure 4, for example, the Application clearly defines the intermediate portion and the end portions of the leaf spring. That is, the end portions (e.g., 12a and 12b) include the portions of the leaf spring fitted into the notches (e.g., 12c and 12d) formed in the leaf spring (e.g., see Application at Figure 5 and page 11, line 12 through page 12, line 5). The intermediate portion of the leaf spring includes the portion of the leaf spring between the end portions (e.g., 12a and 12b).

Second, the Examiner alleges that the claimed invention includes “significant gaps” between the spring and the bearing and between the spring and the support portion. The Examiner, however, is clearly incorrect.

That is, Figure 4 of the Application clearly illustrates that the only gap between the leaf spring and the bearing and the support portion is formed at a point where the end portions of the leaf spring overlap, as is clearly recited in the claimed invention.

Moreover, nowhere does Esturo teach or suggest that the curved leaf spring includes end portions, the end portions being selected from the group consisting of overlapping end portions and end portions having a bent portion.

Therefore, Applicants submit that Esturo does not teach or suggest (nor make obvious) each and every feature of the claimed invention. Therefore, the Examiner is respectfully requested to reconsider and withdraw this rejection.

## **B. The Murakami Reference**

Applicants submit that Murakami does not teach or suggest “*wherein said curved*

*leaf spring comprises end portions, said end portions being selected from the group consisting of overlapping end portions and end portions having a bent portion, and a substantially entire intermediate portion of said curved leaf spring except opposite said overlapping end portions or said end portions having a bent portion of said curved leaf spring contacts said inner surface of said support portion and said outer peripheral surface of said bearing”, as recited in claim 1.*

Murakami merely teaches a bearing (10) mounted on a support (81) by an elastic member (20) (see Murakami at Figure 5). Murakami, however, does not even mention a curved leaf spring, let alone teach or suggest a curved leaf spring being fitted along an outer peripheral surface of the bearing and an inner surface of the support portion. Indeed, the Examiner does not even allege that Murakami teaches or suggest this feature.

Moreover, nowhere does Murakami teach or suggest that the curved leaf spring includes end portions, the end portions being selected from the group consisting of overlapping end portions and end portions having a bent portion.

### **C. The Eda Reference**

The Examiner alleges that Murakami would have been combined with Eda to teach the claimed invention of claims 1, 5, 7, 16, 17 and 19. Applicants submit, however, that, even if combined, the alleged combination would not teach or suggest each and every feature of the claimed invention.

That is, neither Murakami nor Eda, nor any combination thereof, teaches or suggests “*wherein said curved leaf spring comprises end portions, said end portions being selected from the group consisting of overlapping end portions and end portions*

*having a bent portion, and a substantially entire intermediate portion of said curved leaf spring except opposite said overlapping end portions or said end portions having a bent portion of said curved leaf spring contacts said inner surface of said support portion and said outer peripheral surface of said bearing”, as recited in claim 1.*

As indicated in section B of these detailed comments, Applicants submit that Murakami does not teach or suggest this feature of the claimed invention. Furthermore, Applicants submit that Eda fails to make up the deficiencies of Murakami.

The Examiner attempts to rely on Figures 18A and 18B of Eda to support his allegation. The Examiner, however, is clearly incorrect.

That is, nowhere in these figures (nor anywhere else for that matter) does Eda teach or suggest that the curved leaf spring includes end portions, the end portions being selected from the group consisting of overlapping end portions and end portions having a bent portion, and wherein a substantially entire intermediate portion of the curved leaf spring except opposite the overlapping end portions or the end portions having a bent portion of the curved leaf spring contacts the inner surface of the support portion and the outer peripheral surface of the bearing. Indeed, Eda merely teaches a spiral spring (119) disposed between the biasing member (112) and the bearing ring (114) (see Figure 18B and paragraph [0140] of Eda).

As shown in Figure 18B of Eda, a spiral spring (119) is disposed around a biasing member (112). The spring (119) is only fitted around a portion of the biasing member (112). The spring (119) is also only fitted around a portion of the inner surface the bearing ring (114). Thus, gaps are formed between the biasing member (112) and the spring (119), as well as between the spring (119) and the bearing ring (114). Additional

gaps are formed between each concentric layer of the spiral spring (119) (see Eda at Figure 18B). Eda does not teach or suggest this feature.

In contrast, the claimed invention of exemplary claim 1 allows a gap between the curved leaf spring (12) and the inner side (74b) of the support portion (74), and a gap between the curved leaf spring (12) and the rolling bearing (8) to be eliminated. Indeed, the claimed invention of exemplary claim 1 (e.g., as depicted in Figure 4) provides a curved leaf spring (12) where an entire intermediate portion of the curved leaf spring except opposite overlapping end portions of the curved leaf spring contacts the inner surface of the inner surface of the support portion and the outer peripheral surface of the bearing. Thus, the movement of the worm (3) in a direction intersecting the directions of the rotation-axis distance (H) is limited (see Application at page 16, lines 5-11) and the overall size of the worm gear may be made compact (see Application at page 15, lines 17-21).

Moreover, nowhere does Eda teach or suggest that the curved leaf spring includes end portions, the end portions being selected from the group consisting of overlapping end portions and end portions having a bent portion.

Thus, Eda fails to make-up the deficiencies of Murakami.

Therefore, Applicants submit that these references, even if combined, would not teach or suggest each and every feature of the claimed invention. Therefore, the Examiner is respectfully requested to reconsider and withdraw this rejection.



### **III. NEW CLAIMS**

New claims 20 and 21 have been added to claim an additional feature of the invention and to provide more varied protection for the claimed invention. These claims are independently patentable because of the novel and nonobvious features recited therein.

Applicants submit that new claims 20 and 21 are patentable over the cited prior art references at least for analogous reasons to those set forth above with respect to claims 1, 5, 7, 16, 17 and 19.

### **III. FORMAL MATTERS AND CONCLUSION**

In view of the foregoing, Applicants submit that claims 1-10, 14-17 and 19-21, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

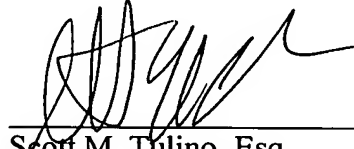
Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

Attorney Docket No. K06-165049M/TBS 19  
Serial No. 10/743,317  
NGB.347

The Commissioner is hereby authorized to charge any deficiency in fees or to  
credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

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